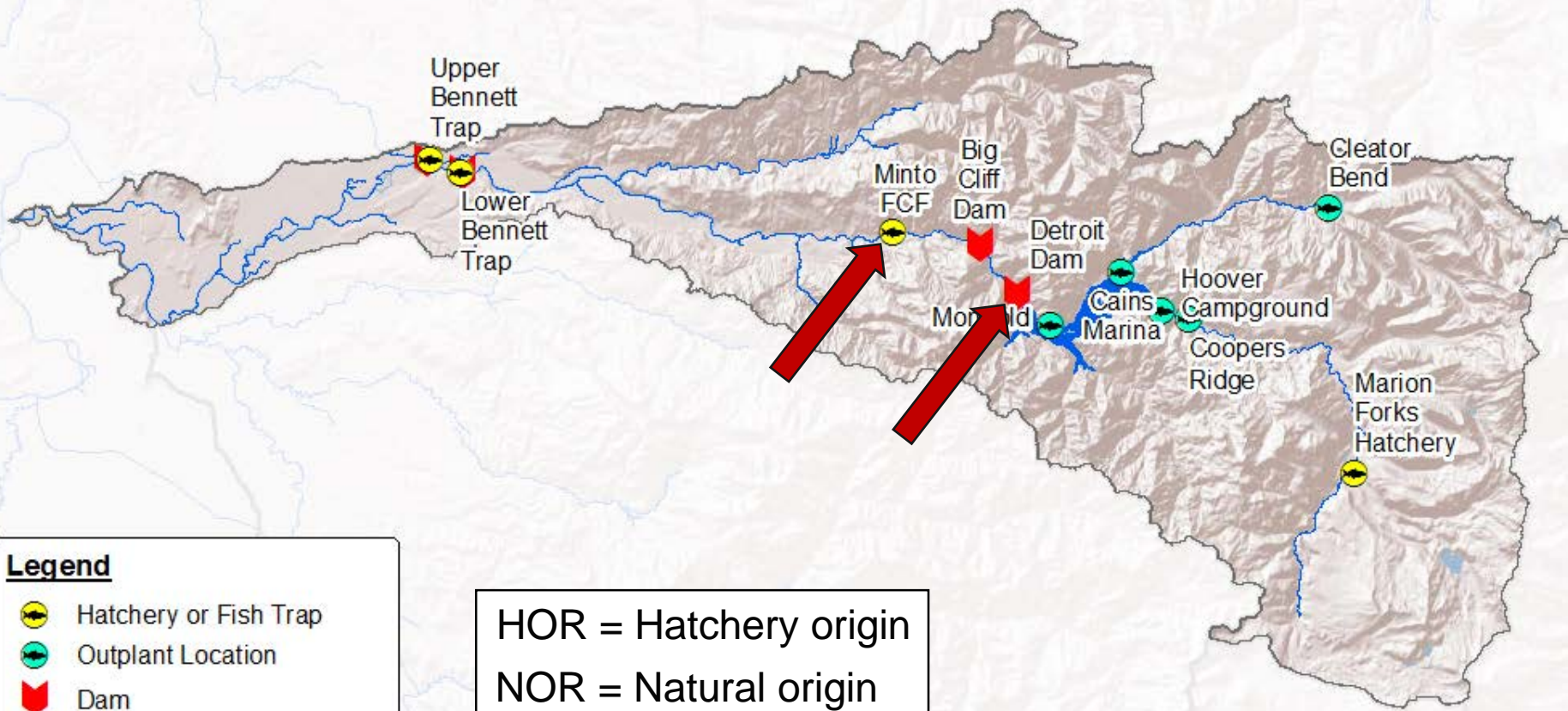


# An evaluation of spring Chinook salmon reintroductions above Detroit Dam, North Santiam River using genetic parentage analysis

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# North Santiam River



## Legend

- Hatchery or Fish Trap
- Outplant Location
- Dam
- Reservoir
- Spring Chinook Distribution

HOR = Hatchery origin

NOR = Natural origin

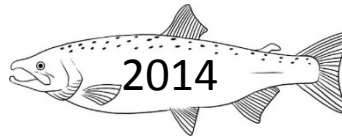
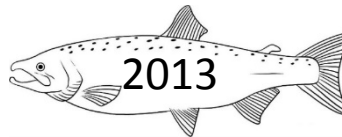
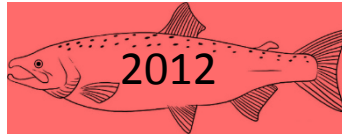
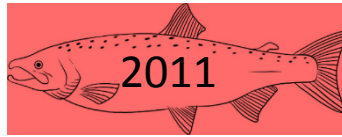
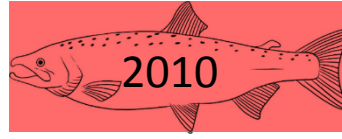
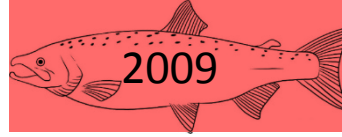
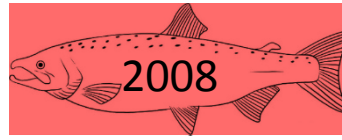
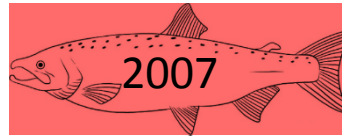


# North Santiam Reintroduction Program (2007 – 2014)

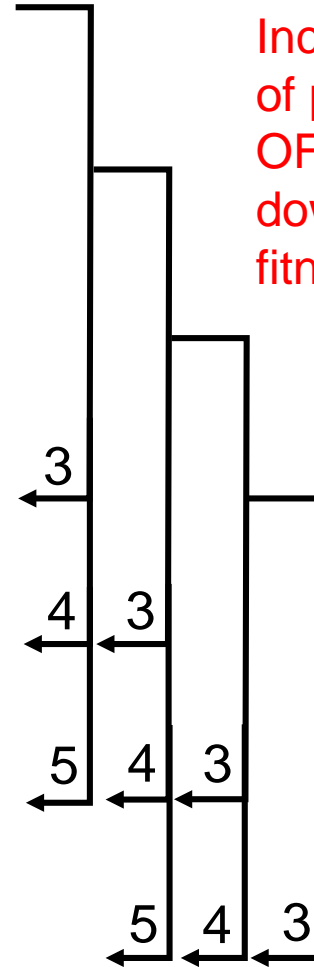
Incomplete sampling of putative PARENTS will downwardly bias assignment rates

Approximate Age Distribution

~5% Age-3  
~52% Age-4  
~41% Age-5



Incomplete sampling of putative ADULT OFFSPRING will downwardly bias fitness estimates





# Putative Parents: HOR Adult Outplants

# Putative Offspring: NOR Adult Recruits

\*NOR salmon released above Detroit Dam

‡ Includes 74 NOR adult recruits sampled at Bennett Dam

# Objectives

1. Determine the number and proportion of unmarked, presumed NOR adult spring Chinook salmon (2010 - 2014) that were progeny of salmon outplanted above Detroit Dam (2007 - 2011).
2. Estimate the fitness of spring Chinook salmon outplanted above Detroit Dam (2007 - 2010).
  - Based on parentage analysis of NOR adult Chinook salmon sampled at Bennett Dam (2011), MFCF (2013 and 2014), and on spawning grounds below Big Cliff Dam (2011 - 2014).
3. Estimate Cohort Replacement Rate (CRR) for spring Chinook salmon released above Detroit Dam in 2009.

# Objective 1 Results: NOR Assignments to HOR Outplants (2007 – 2011)

NOR Cohort	Assignment Rate	Age-3	Age-4	Age-5
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2010	6/50 (12%)	6	-	-
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# Objective 2 Results: Fitness Estimates for HOR Outplants (2007 – 2011)

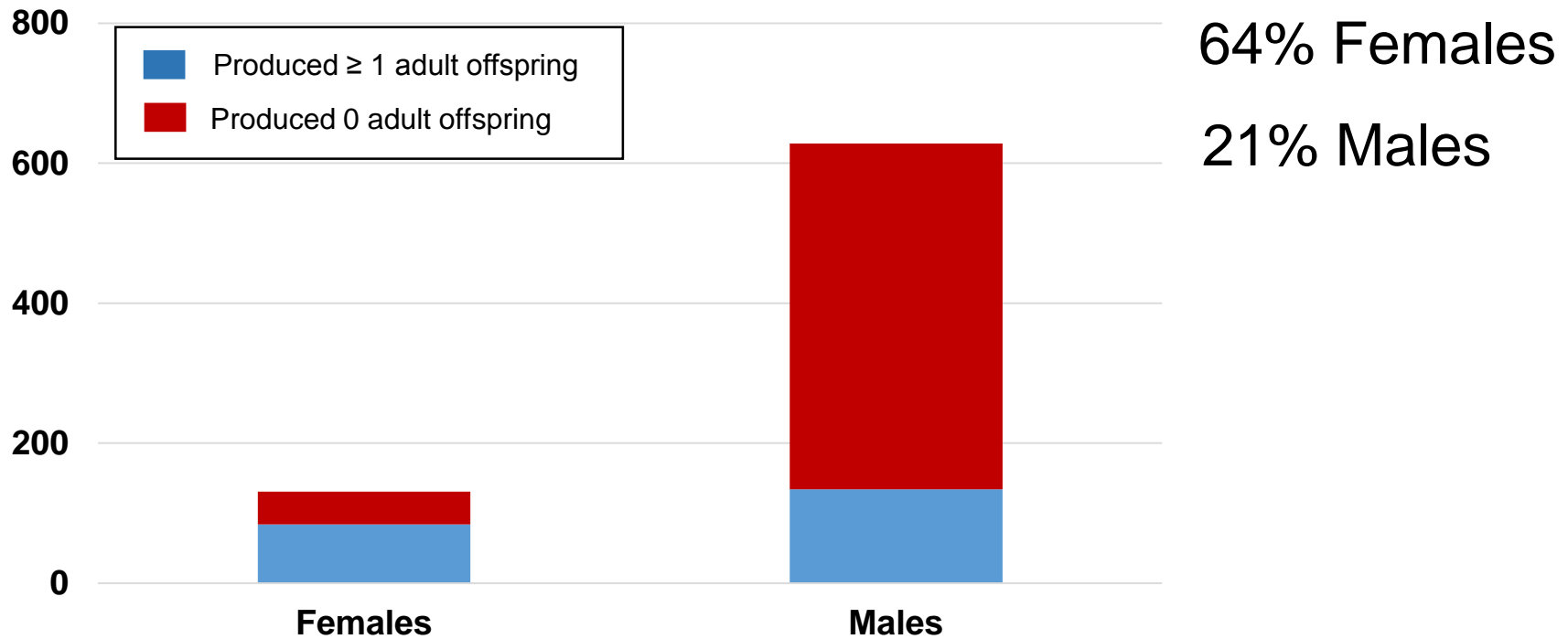
HOR Cohort	Produced $\geq 1$ Adult Offspring	Total Outplanted	% Produced $\geq 1$ Adult Offspring
2007	137	922	<b>15%</b>



# Objective 2 Results: Fitness Estimates for HOR Outplants (2007 – 2011)

2009 HOR Cohort

% Produced  $\geq 1$   
Adult Offspring



Mean fitness =  $2.72 \pm 3.53$  SD

$0.52 \pm 1.62$  SD

# Objective 2 Results: Fitness Estimates for HOR Outplants (2007 – 2011)

HOR Cohort	Produced $\geq 1$ Adult Offspring	Total Outplanted	% Produced $\geq 1$ Adult Offspring
2010	465	2109	<b>22%</b>

# Objective 3 Results: Cohort Replacement Rates (CRR)

River	Year	Genotyped	M:F	♀CRR	♀♂CRR
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N Santiam	2009	759	4.8 : 1	1.07	0.54
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$$\frac{141}{131} = 1.07$$

$$\frac{407}{759} = 0.54$$

# Objective 3 Results: Cohort Replacement Rates (CRR)

River	Year	Genotyped	M:F	♀ CRR	♀♂ CRR
N Santiam	2009	759	4.8 : 1	1.07	0.54
S Santiam	2007	252	1 : 1	0.96	-
	2008	659	2 : 1	1.16	1.09
	2009	412	1.6 : 1	1.55	1.56
SF McKenzie	2007	746	1.3 : 1	0.40	0.43
	2008	873	2 : 1	0.31	0.28
	2009	1,386	1.3 : 1	0.07	0.08
	2010	748	1.8 : 1	0.18	0.16

# Summary

- Most NOR adult salmon sampled in 2013 (59%) and 2014 (66%) were progeny of salmon outplanted above Detroit Dam
  - These are minimum estimates due to incomplete sampling of parents
- 15% of 2007 and 2008 outplants produced progeny
  - These are minimum estimates of fitness due to limited sampling of putative progeny in 2011-2012 (i.e. due to Minto closure)
- 29% of outplants in 2009 produced at least one adult recruit, and among females, the limiting sex that year, 64% produced progeny
  - Female fitness was on average ~5X that of males and fitness was highly variable among individuals (range: 0-20 progeny)
- CRR was 1.07 in 2009, as estimated from female replacement.

# Ongoing Research

- Genotype the 2015 NOR adult recruits (N = 615) and assign to salmon outplanted above Detroit Dam in 2010 - 2012
- Estimate fitness and CRR for the 2010 HOR outplants
  - Largest release of HOR fish above Detroit Dam (N > 2,000)
  - Approximately 80% were tissue-sampled
  - Relatively even sex ratio
- Calculate preliminary fitness estimate for 2011 cohort
  - Small release of HOR fish above Detroit Dam (N = 150)
  - 100% were tissue-sampled
  - Even sex ratio



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- **ODFW field crew**



Thank you

